Quiz

Capacitance.

Previous Quiz

List the type filter. #1 is a low pass filter (has an inductor in-line and a bypass capacitor). #2 is a high-pass filter (has the capacitor in-line and a bypass inductor).

The input to the transformer is 120 VAC and it has a 1:2 ratio. What are the output voltages?

Match the waveforms below to the point in the circuit that will appear on an oscilloscope. AC voltage to left input. Unregulated DC to output of bridge rectifiers. Regulated DC to right side of filter caps. High frequency AC voltage on right side of transformer. Chopped DC between transistor and left side of transformer. This is a switching power supply. Change AC to DC to high frequency AC to allow use of reduced size components (high frequency AC requires smaller component size) and thus light weight.

The circuit at the left uses no coupling caps and it is called a ____ ____ amplifier. DC/direct coupled. One of the drawbacks is that each stage needs a different supply voltage; this makes it more expensive. The capacitors in it are emitter bypass capacitors. The collector is allowed to swing farther by having a bypassed emitter. These are all common emitter. If we didn't have the resistors at the emitters, we would not need the capacitors. The resistors bias up the emitter voltage to make the transistor operate within spec. Bypass capacitors boosts the gains of the stages. Could use a direct coupled amplifier to amplify DC, like the output of a photodiode. DC amplifiers are susceptible to thermal runaway; might put thermistors in the emitter to compensate. Once AC couple a video signal, must clamp.

The RC time constant uses the values of resistance and capacitance in its calculations.

A capacitor takes how many time constants to become fully charged? 5 as a practical matter. Actually, an infinite number of time constants.

The reactance formula for a capacitor is 1 / (2 pi f C)

The reactance formula for an inductor is 2 pi f L

The formula for resonance using an inductor and a capacitor is fr = 1 / (2 pi (LC) ½).

Recently a laser diode pumped fiber optic laser has been demonstrated yielding pulses as short as 17 femtoseconds. 1 fsec is to one second as 1 second is to 1 petasecond (some millions of years).

If have a DC source in parallel with an AC source, what voltage happens? The battery acts as a short to AC. At the end of a power supply, there is a capacitor; this acts as a dead short to AC.

If put 10000 mf capacitor across a 1 VAC power supply running at 1 kHz, have a capacitive reactance of 16 milliohms. This is just about a dead short to this AC voltage.

Lab

Grab a VTR and mess with it.